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ABSTRACT

This exploratory study is concerned with identifying several measures of career attainment for historians and with relating these measures to Graduate Record Examination (GRE) scores and to other relevant characteristics. The basic hypothesis of the study is that abilities measured at the time of admission to graduate school are related to career performance after earning the doctorate. The analysis sample for this study included 83 historians who had earned a doctorate in history in 1963-64 or 1964-65, who had earned a bachelor's degree between 1954 and 1962, and who had retrievable test scores on the Aptitude Test and an Advanced Test of the GRE. Citation counts obtained from the Social Sciences Citation Index served as the main indicator of attainment. The rating of the graduate faculty in History for each historian's doctoral university as reported by Cartter (1966) was included in the study as a predictor. Because the sample size was quite small (83 historians), any conclusions based on these data must be quite tentative. Nevertheless, it is of interest that GRE-Verbal and GRE Advanced test scores and department quality ratings yield small positive correlations with citation counts from the Social Sciences Citation Index. These results are sufficiently promising to warrant further studies of similar design based on scholars who attained the doctorate in other years or who specialized in other fields. (Author)

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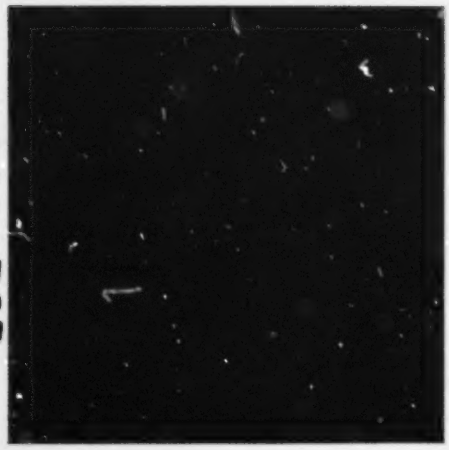

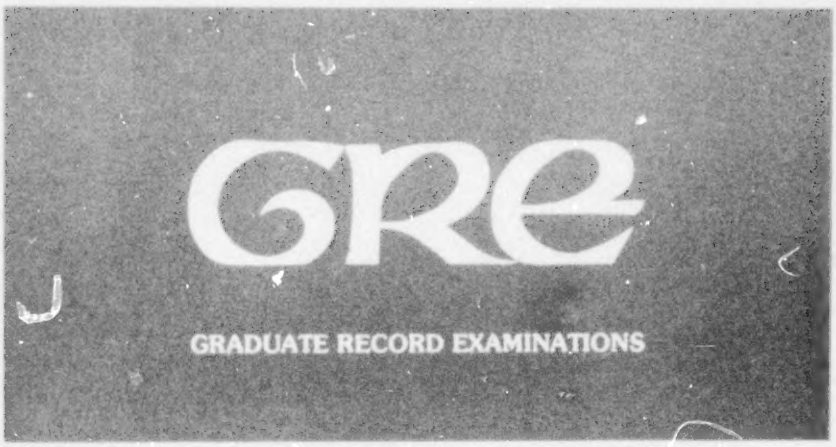


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# GRE SCORES AS PREDICTORS OF CAREER ACHIEVEMENT IN HISTORY

William B. Schrader

GRE Board Research Report GREB No. 76-1bR

November 1980

This report presents the findings of a research project funded by and carried out under the auspices of the Graduate Record Examinations Board.

EDUCATIONAL TESTING SERVICE, PRINCETON, NJ

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FOR GENERAL AUDIENCE

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## ABSTRACT

This exploratory study is concerned with identifying several measures of career attainment for historians and with relating these measures to GRE scores and to other relevant characteristics. The basic hypothesis of the study is that abilities measured at the time of admission to graduate school are related to career performance after earning the doctorate. The study was so designed that a number of its results could be compared with those of a study of psychologists reported in GRE Research Board Report GREB No. 76-1R.

The analysis sample for this study included 83 historians who had earned a doctorate in history in 1963-64 or 1964-65, who had earned a bachelor's degree between 1954 and 1962, and who had retrievable test scores on the Aptitude Test and an Advanced Test of the GRE.

Citation counts obtained from the Social Sciences Citation Index served as the main indicator of attainment. The rating of the graduate faculty in History for each historian's doctoral university as reported by Cartter (1966) was included in the study as a predictor.

Because the sample size was quite small (83 historians), any conclusions based on these data must be quite tentative. Nevertheless, it is of interest that GRE-Verbal and GRE Advanced test scores and department quality ratings yield small positive correlations with citation counts. These results, when considered along with results obtained in a recently-completed study of psychologists, are sufficiently promising to warrant further studies of similar design based on scholars who attained the doctorate in other years or who specialized in other fields.

# GRE Scores as Predictors of Career Achievement in History

## Introduction

Evidence concerning the usefulness of GRE scores for predicting successful performance in graduate work has been summarized by Willingham (1974). Studies of the relation of scores to later achievement, although not directly relevant to evaluating the tests, are valuable for the information they can yield about the meaning of the test scores. In discussing the SAT, Chauncey (1962) made the following statement: "While the interest of most people in the SAT is focussed in its ability to predict academic success in college, the significance of the test is really much more basic. It is a test that provides a great deal of information about two important qualities that have wide relevance in our society--verbal and mathematical ability". An analogous statement could be made about the abilities measured by the GRE aptitude test.

Critics of standardized testing and of meritocracy may point to the absence of solid data on long-range consequences of selection as evidence of a lack of broad social concern on the part of testers and test users, even though, strictly speaking, tests should be validated only in terms of their stated purposes. Long-range studies relating test scores to career achievement can hardly be expected to satisfy these critics. So many important decisions, significant experiences, and fortuitous events intervene between the time when admissions tests are taken and the time when career performance can be assessed that high correlations between test scores and career performance are unlikely to be found. What long-range studies can do is to provide evidence on whether a relationship between admissions test scores and performance exists despite all these obscuring influences. They can, in addition, throw some light on the contribution of the abilities measured by these tests to career performance in various fields.

## Related Research

Related evidence on the relation of abilities measured by tests to various aspects of career achievement is provided by a number of studies. In a survey concerned with aptitude tests and the highly able, Chauncey and Hilton (1965) located five studies that are related to the present study. One study, by Roe (1953) included the administration of short tests of verbal, mathematical, and spatial abilities to small but carefully chosen samples of biologists, physical scientists, and social scientists. She found that these scientists performed remarkably well on the tests, with some exceptions.

Chauncey and Hilton (1965) summarize a study by Kallop, who located College Board SAT scores for a number of persons listed in Who's Who in America or in American Men of Science. Both groups earned scores markedly higher than College Board candiates in general. Harmon (1959) obtained ratings on scientific achievement in 1959 of 355 fellowship candidates tested in 1948. For 219 fellowship awardees, and for the total group, he found relatively small (.21 to .28) but statistically significant correlation coefficients with the ratings for Quantitative scores and Advanced Test scores, but not for Verbal scores. For 136 scientists who did not receive an award, correlation coefficients were very low and not statistically significant. Terman and Oden (1959) in their major follow-up study of gifted children found only a modest difference in childhood IQ and in Concept Mastery Test scores in favor of adults rated as "successful" over a group rated as "unsuccessful." In the Terman and Oden study, all members of the sample had obtained intelligence test scores as children which placed them in the top 1% of their age group. Lastly, Taylor (1963) studied the relation of ratings of the creativity and productivity of research scientists to various tests. He found relationships between the ratings and the Concept Mastery Test which were not statistically significant. The Owens-Bennett (Form CC) Mechanical Comprehension Test, however, showed significant positive relations with the ratings.

In his classic study of American Psychologists, Clark (1957) did not have data on test performance. However, he did find that of his carefully defined group of significant contributors to psychology, 65% of the 1940-44 Ph.D. group reported that they were in the top 5% of their class in undergraduate work as compared with 37% of his comparison group of psychologists in general. Clark's study also provides a substantial amount of relevant data on various indicators of research productivity, as does a recent article by Porter and Wolfle (1975).

Wallach (1976) cites a number of studies, mainly exploratory in nature, in which various test scores did not differentiate between criterion groups defined by peer ratings. Studies of mathematicians by Helson and Crutchfield (1970), of graduate students by Bloom (1963) and of architects and scientists by MacKinnon (1968) show this pattern. Marston (1971) studied the relation of GRE scores to publications records of psychologists who earned the doctorate at the University of Southern California, and concluded that the scores had little or no predictive value. Weitzman (1972) and Burns (1972) have pointed out certain limitations in Marston's analysis and interpretations of his data. Studies relating GRE scores and a number of other variables to career archievement by Clark and Centra (in press), used publications and income as criteria. For the samples studied, the correlations between scores and the criterion measures were small.

The development of the Science Citation Index and, later, the Social Sciences Citation Index facilitates the use of citations as a criterion. As Bayer and Folger (1966, p. 386) point out, "what people cite in scientific writing is in general what they think is

important; no other single measure gets at a man's contribution so directly." Bayer and Folger (1966) and Folger, Astin, and Bayer (1970) found only quite low correlations between ability as measured by various high school intelligence tests and citations. However, Creager (1966, 1967) found small but statistically significant correlations between GRE scores and citations for samples of National Science Foundation fellowship applicants.

Taken as a whole, these results suggest that the relationship between test performance and career achievement is not likely to be high when studies are based on highly selected groups. On the other hand, they suggest that the relationship between test performance and career achievement is high enough to warrant further research, especially if large samples and better dependent variables than ratings can be identified.

## Definition of the Basic Sample

Although there are important advantages to limiting the sample to persons who earned the doctorate during the same year, it was found necessary to include persons from two successive academic years in order to obtain a sufficiently large sample to warrant analysis. It was judged that the resulting sample would be sufficiently similar in amount of post-doctoral experience to permit treating it as a single group in the statistical analysis.

All of the historians included in the sample were listed in American Doctoral Dissertations for 1963-64 or 1964-65. Citations were counted for the period of 1972 through 1977. Thus, at least 12 years elapsed between the year when the doctorate was awarded and the last year for which citations were counted.

The source of basic identifying information was the sixth edition of the Director of American Scholars (1974). The sample was limited to persons listed in that directory.

A decision to include only persons who had earned the bachelor's degree in 1954 or later further limited the sample. This limitation, which was also applied in the study of psychologists, was adopted for the following reasons: (1) Measures of achievement were considered to be more nearly comparable when variations in length of time between bachelor's and doctor's degrees were restricted somewhat, (2) it was thought that relatively few scores would be retrieved for years prior to 1954, and (3) this rule facilitated the systematic search of GRE files and made it unnecessary to take account of the redefinition of the GRE score scales introduced in the fall of 1952.

Finally, historians whose date of birth was not available, or who earned a doctorate in an institution outside the United States were excluded from the base sample.

The number of historians listed in American Doctoral Dissertations for the two selected academic years was 1,039. In addition, twelve female historians whose middle name suggested that they may have married prior to earning the doctorate were identified. In all, 640 of these historians were located in the Directory of American Scholars, including six of the twelve whose name may have changed after taking GRE but before earning the doctorate.

The rule requiring a bachelor's degree in 1954 or later reduced the number of names to 424. As it turned out, no sample member was excluded solely because date of birth was not available. Five sample members were excluded because their doctorate was not earned at a United States institution.

As a result of those steps, score files were searched for a total of 419 names, of which six were names of women who were looked up both under their full names and under their possible maiden names. Score files were systematically searched, beginning with 1961 and continuing until the year in which the A.B. was earned. (One historian who earned an A.B. in 1962 was looked up only in the file for that year.) However, if an historian had both aptitude and advanced scores in the years 1959 through 1961, no search was made for possible earlier scores. In the data analysis, if the person took a GRE test more than once, the more recent scores were used.

Both aptitude and advanced test scores were found for 83 historians. Identification was checked by comparing the institutional test center at which the GRE was taken with the biographical data for that person. As it turned out, the 83 historians for whom scores were found did not include any of the six for whom possible maiden names were looked up. These 83 historians had earned doctorates at 40 different institutions. Of the 83, 25 had earned doctorates at four institutions that were represented in the sample by five or more members.

GRE aptitude and advanced test scores were found for about 20 percent (83 of 413) of the persons included in the score file searched. A few persons may have been missed because the search was limited to files for 1954 and later years or because the files were designed to retrieve scores for persons known to have taken the test. It seems very likely, however, that the small percentage of the search sample for whom scores were located is an accurate reflection of participation in GRE testing by the sample members. Scores for either the aptitude or the advanced test were found for a number of persons. Those who had an advanced test but no aptitude test are likely to have been tested in a college that administered the advanced tests but not the aptitude tests to graduating seniors. Scores from those institutional administrations were reported, at the student's request, to graduate schools, and were included in the GRE score files.

The relatively low percertage of test participation is consistent with the fact that the GRE program designed for admission to graduate school was relatively small in the late 1950s, the period when the bulk of the sample members took the GRE. The admission program of GRE tested only 15,263 students in 1957-58 and 21,731 students in 1958-59. For comparison, the number tested in the admission program in 1963-64 was 81,768.

The percentage of scores retrieved for historians was noticeably smaller than the corresponding percentages for pyschologists. In that study, aptitude and advanced scores were found for 35 percent (150 of 428) of the psychologists for whom scores were looked up. The higher rate of retrieval is presumably the result of more widespread use of the test for admission to graduate study in psychology than in history in the late 1950s.

## Description of Variables

Available data sources permitted the identification of 12 variables considered appropriate for the study, as follows:

### Cartter Rating of Department

The university where the historian earned a doctorate was categorized on the rated quality of the graduate faculty in history as reported by Cartter (1966). This variable was designated "Cartter Rating of Department." The following codes were used in the analysis:

5 = "Distinguished"

4 = "Strong"

3 = "Good"

2 = "Adequate plus"

1 = not listed

In Cartter's survey, the "Distinguished" group included 8 universities, the "Strong" group included 12, the "Good" group included 13 and the "Adequate plus" group included 17.

### GRE-Verbal

This test is a measure of reading comprehension and other verbal abilities designed for used in graduate school admissions.

GRE-Quantitative

This test is a measure of quantitative ability designed for use in graduate school admissions. It emphasizes ability to handle mathematical relationships rather than formal mathematical achievement.

GRE-Advanced

GRE Advanced Tests for various fields are designed to measure achievement in courses likely to be included in a college major in a particular academic field. In this study, an historian's Advanced Test score was used even if it were in a field other than history. In all, 2 of the 83 historians in the GRE sample had taken a test in a different field.

Citations

This variable was defined as the number of articles that cited one or more publications of each historian in the volumes for 1972 through 1977 of the Social Sciences Citation Index. The fact that the citation count does not include citations in books but only those in journal articles should be noted, particularly because books play a relatively large role in the scholarly publications of historians. Self-citations were included in the count. For historians having two initials, citations were also checked on the basis of last name and first initial. Records were reviewed in detail to avoid crediting citations to members of the sample that belonged, in fact, to another person having the same last name and initials. Most of this work was done using a computer printout that listed each source article and all citations to it. Further work seeking to obtain a full count of all citations without introducing false attributions and without excessive costs would be desirable in future studies.

Normalized Citations

As frequently occurs when variables are defined by counting, the distribution of the citations variable was markedly skewed. Three ways of making the variable more amenable to analysis were considered: logarithmic transformation, square-root transformation, and normalizing. Because the sample size was judged to be too small to justify empirical study of the relative merits of these transformations, it was decided to group the data into a small number of categories and to normalize the distribution. This was done by taking the mean normal deviate for each category as the scale value of each. For convenience in analysis, a linear transformation was applied to

place these normal deviates on a scale having a mean of 50 and a standard deviation of 10. The actual mean of the normalized citation scores was 50.0 and the standard deviation was 9.7 for the 83 members of the sample.

The following table shows the eight intervals, the percentage of the group in each interval, and the scale value:

| Number of Citations | Percent in Group | Scale Value |
|---|---|---|
| 53 - 174 | 4.8 | 71 |
| 21 - 33 | 4.8 | 65 |
| 9 - 16 | 9.7 | 61 |
| 5 - 8 | 12.1 | 57 |
| 3 - 4 | 12.1 | 53 |
| 2 | 15.6 | 50 |
| 1 | 12.1 | 46 |
| 0 | 28.9 | 38 |

Published Book

This variable was defined essentially by whether or not the historian's name appeared in Books in Print, 1978-79. Information in the Directory of American Scholars was used to check the identification of the individual. Those who were authors, co-authors, editors, or co-editors of a book currently in print was assigned a score of "1" and all others were assigned a score of "0" on this variable.

Awarded Prize

The relatively small number of historians in this sample who reported in the Directory of American Scholars that they had been awarded a prize were given a score of "1" and all others were given a score of "0".

Post-doctoral Fellow

Historians who reported in the Directory of American Scholars that they had held one or more postdoctoral fellowships were given a score of "1" and all others a score of "0" on this variable.

Year of Birth

Data were obtained from the Directory of American Scholars.

Year of A. B.

The year in which the A. B. (or other bachelor's degree) was awarded was obtained from the Directory of American Scholars.

Year of Ph.D.

This variable was defined on the basis of the academic year during which a sample member was listed in American Doctoral Dissertations. Those listed in the 1963-64 volume were coded "1" and those listed in the 1964-65 volume were coded "2".

The main statistical results of this study are shown in Table 1, which reports the intercorrelations of: three GRE test scores, Cartter ratings of department quality, number of citations, three other measures of scholarly achievement, year of birth, year when bachelor's degree was earned and year of doctorate.

## Predicting Citations from Scores and Department Quality Ratings

Findings concerning the intercorrelations of Cartter Ratings of Department, GRE scores, and citations are of central importance to this study. The correlations of GRE scores with citations indicate the extent to which a historian's citations can be predicted from data available at the time of admission to the graduate school at which he or she earned the doctorate. The results differ in detail depending on whether citations are treated as a simple frequency count or as a normalized variable, as shown below:

| Variables | Correlations with: Citations | Normalized Citations |
|---|---|---|
| Cartter Ratings of Department | .27 | .20 |
| GRE Scores: | | |
| Verbal | .18 | .23 |
| Quantitative | .00 | -.04 |
| Advanced | .14 | .23 |

Although the small sample size (83 historians) does not warrant definitive interpretations or complex statistical analyses, the results suggest that other factors than test scores or department quality as measured by Cartter ratings are the main determiners of how often an author's work will be cited. Only three of the eight coefficients are significant at the 5% level. (Quality ratings with Citations, GRE-Verbal and GRE Advanced with Normalized Citations.) The neglibible correlations of GRE-Quantitative with citations seem plausible if it is assumed that those historians were unlikely to emphasize quantitative interests in their research. Finally, the superiority of the Advanced Test to the aptitude scores as a predictor, found in the study of psychologists (Schrader, 1978) does not appear in this sample of historians, although the Advanced Test performs about as well as does GRE-Verbal.

TABLE 1

Intercorrelations of Test Scores, Measures of Achievement and Background Variables[a]

| Variable[b] | Cartter Rating | GRE Scores: V | Q | Adv. | Citations | Normalized Citations | Book | Prize | Post-doctoral Fellow | Year of Birth | Year of AB | Year of PhD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cartter Rating of Department | 1.00 | .53 | .22 | .25 | .27 | .20 | .02 | .10 | .17 | .21 | -.10 | .15 |
| GRE Scores: | | | | | | | | | | | | |
| Verbal | .53 | 1.00 | .36 | .54 | .18 | .23 | .07 | -.01 | .26 | .16 | -.08 | .14 |
| Quantitative | .22 | .36 | 1.00 | .45 | .00 | -.04 | -.13 | -.14 | -.09 | -.07 | -.12 | .08 |
| Advanced | .25 | .54 | .45 | 1.00 | .14 | .23 | .05 | -.02 | .12 | -.12 | -.18 | .01 |
| Citations | .27 | .18 | .00 | .14 | 1.00 | .60 | .31 | .54 | .38 | .14 | .03 | -.15 |
| Normalized Citations | .20 | .23 | - | .23 | .60 | 1.00 | .62 | .46 | .47 | .18 | .02 | -.15 |
| Published Book | .02 | .07 | -.13 | .05 | .31 | .62 | 1.00 | .15 | .42 | .18 | .07 | -.13 |
| Awarded Prize | .10 | -.01 | -.14 | -.02 | .54 | .46 | .15 | 1.00 | .27 | .13 | .09 | -.07 |
| Post-doctoral Fellow | .17 | .26 | -.09 | .12 | .38 | .47 | .42 | .27 | 1.00 | .22 | .03 | -.09 |
| Year of Birth | .21 | .16 | -.07 | -.12 | .14 | .18 | .18 | .13 | .22 | 1.00 | .42 | -.04 |
| Year of AB | -.10 | -.08 | -.12 | -.18 | .03 | .02 | .07 | .09 | .03 | .42 | 1.00 | .04 |
| Year of PhD | .15 | .14 | .08 | .01 | -.15 | -.15 | -.13 | -.07 | -.09 | -.04 | .04 | 1.00 |
| Mean | 3.33 | 619 | 558 | 605 | 8.3 | 50.0 | .52 | .10 | .27 | 34.8 | 57.7 | 1.48 |
| SD | 1.44 | 107 | 109 | 85 | 22.1 | 9.7 | .50 | .30 | .44 | 3.9 | 1.4 | .50 |

[a]Significance levels: For a sample of 83, the 5% level is .22; the 1% level is .28

[b]Variables are described on pages 3 and 4.

## Relations Between Scores and Department Quality Ratings

Department quality ratings were reasonably well distributed over the five categories in this sample. Of the 83 historians, 26 earned the doctorate in a university in the "5" category. The number for the other categories was 16 for category "4", 15 for "3", 13 for "2" and 13 for "1". When the correlations of test scores with department quality ratings are considered, the correlation of GRE-Verbal is relatively high (r=.53) and the correlations of GRE-Quantitative (r=.22) and GRE Advanced (r=.25) are relatively low, although both are significant at the 5% level. Those results are consistent with the expectation that persons earning doctorates at highly-rated departments tend to have higher test scores than those whose doctorates were earned in less highly-rated departments.

The finding that department quality ratings are correlated with test scores raises the possibility that the correlations between test scores and citations may be attributable, at least in part, to the role that scores play in gaining access to departments with high quality ratings. Although there are certain logical difficulties in using partial correlation methods to throw light on this question, two partial correlations were calculated. The correlations of GRE-Verbal with Normalized Citations dropped from .23 to .15 when department quality ratings were partialled out. The corresponding correlations for GRE Advanced were .23 and .19. Although neither partial correlation is statistically significant in a sample of this size, the results make it clear that partialling out the Cartter ratings results in only a moderate reduction in the correlations within this sample.

## Additional Measures of Achievement

In addition to citations, three additional measures of postdoctoral achievement were studied. Each of these variables was used only to divide the sample into two groups: Those who were authors, co-authors, editors, or co-editors of at least one book currently in print vs those who were not; those who reported that they had received one or more prizes vs those who did not; and those who reported holding one or more postdoctoral fellowships vs those who did not. It must be acknowledged that more refined definitions of these variables might have produced somewhat different results. It was thought, however, that the relatively simple definitions used would be adequate for an exploratory study.

Considering first those who had published a book, it is of interest that 52 percent of the 83 historians had done so. Correlations of this variable with department quality ratings and scores were quite low. It correlated substantially (r=.63) with Normalized Citations, and moderately (r=.31) with Citations and with holding a postdoctoral fellowship (r=.47).

Only two percent of the group reported having received a prize. It is possible that this variable would be more useful as a measure of achievement if more time had elapsed between the doctorate and the time when the variable was defined. In any case, receipt of a prize correlated only .10 with department quality rating and from -.01 to -.14 with test scores. Correlations with Citations and with Normalized Citations were .54 and .46, respectively. Historians who received a prize were more likely to have held a postdoctoral fellowship (r=.27).

About one-fourth of the group held a postdoctoral fellowship. This variable yielded a correlation of .26 with GRE-Verbal and of .17 with department quality rating. Its correlation with citations was .38; with Normalized Citations, its correlation was .47. These findings are consistent with the view that historians who held postdoctoral fellowships were more productive than those who did not.

Additional Background Variables

Results for age, year of bachelor's degree, and year of doctorate are difficult to interpret because year of bachelor's was allowed to range only from 1954 to 1962, and because the sample was limited to persons who earned doctorates in 1963-64 or 1964-65. Nevertheless, it may be noted that younger members of the sample showed some tendency to earn doctorates at higher-ranked departments, to have higher GRE-Verbal scores, and to score higher on citations. Younger sample members were more likely to have published a book, to have won a prize, and to have held a post-doctoral fellowship. Among these variables, however, only holding a postdoctoral fellowship yielded a statistically significant correlation with age.

In this study, year of bachelor's is an approximate measure of how short a time elapsed between bachelor's and doctorate's degree. Correlations are relatively small except for GRE Advanced (r=.18) and year of Birth (r=.42). Within this sample, younger members earned their doctorates more rapidly than older members. Although this finding is plausible, the data of the study do not permit a more detailed explanation of why this result occurred.

Year of doctorate is of methodological interest only. The results may throw some light on the consequences of pooling data for historians who earned doctorates in two successive academic years in the analysis. The small negative correlation (r=-.15) between year of doctorate and both measures of citations indicates that historians who earned a doctorate in 1964-65 had slightly fewer citations than those who earned the doctorate in 1963-64. As it happens, the 1964-65 group was slighly higher on ratings of department quality (r=.15) and on GRE-Verbal (r=.14). The effect of this difference may be illustrated by partialling out Year of Ph.D from the correlation between department quality rating and citations. The effect is to increase the correlations from .27 to .30. Similarly, partialling out Year of Ph.D from the correlation between GRE-Verbal and Normalized Citations increases the correlation from .23 to .26. The

effects for these correlations are larger than would be obtained for the other correlations. The results provide some indication of how much pooling data for successive years may affect the statistical results.

## Summary and Conclusions

A study of the relation of SAT and GRE scores to the career achievement of psychologists indicated that abilities measured at the time of admission to college or graduate school were related to career productivity, particularly as measured by the frequency with which a psychologist's work was cited by colleagues.

The present study was initiated to apply a similar basic approach to data for historians, mainly because of interest in substantive results for a different group, but also to learn more about feasibility of the method for a group other than psychologists. In this study, test scores were limited to those earned on GRE tests.

It turned out that even when historians who earned the doctorate in two successive academic years were included in the study sample, only 83 historians who had data on both GRE aptitude and advanced tests and who met the other criteria for inclusion in the study could be located.

The relatively small size of the study sample does not permit drawing detailed conclusions with confidence. The results suggest, however, that ability levels on GRE-Verbal and on GRE Advanced and quality ratings of the department in which the doctorate was earned are correlated with productivity as measured by citations. The correlation coefficients are relatively small. The finding that the coefficients are small is plausible when it is recognized that the members of this group are undoubtedly highly selected with respect to ability and that many determiners other than ability affect the extent to which their work is cited by their colleagues.

An important limitation of the studies of psychologists and historians is the small number of persons included in the samples. For this reason, it is recommended that further studies using this design be based on persons earning the doctorate in 1966-67, 1967-68 and possibly 1968-69, and that specific attention be given to defining an appropriate way of combining data for persons who earned the doctorate in different years. Because the GRE program grew rapidly in the 1960s, it seems likely that the shift to later years would provide a more satisfactory data base for statistical study than the years chosen for the initial studies of psychologists and historians.

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